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S&H Form: (2/01)

Docket No.: 1454.1189

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Gustavo DECO et al.

Serial No. 09/530,983 Group Art Unit: 3762

Confirmation No. 5072

Filed: May 8, 2000 Examiner: OROPEZA, FRANCES P

For: ARRANGEMENT FOR PREDICTING AN ABNORMALITY OF A SYSTEM AND FOR IMPLEMENTING AN ACTION OPPOSING THE ABNORMALITY

APPEAL BRIEF UNDER 37 C.F.R §§ 1.191 AND 1.192

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to the Appellant's Notice of Appeal, filed July 19, 2004, Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Final Office Action, mailed January 27, 2004 (paper no. 28).

Appellant submits this Appeal Brief in triplicate as required by 37 C.F.R. §1.192(a) along with the filing fee of $330.00 set forth in 37 C.F.R. §1.17(f).

I. Real Party in Interest

Pursuant to 37 C.F.R. §1.192(c)(1), due to an assignment executed on October 9, 1998, and November 9, 1998, respectively, by the inventors Gustavo Deco and Louis-J Dubé, and submitted for recordation in the United States Patent and Trademark Office on May 8, 2000, the real party in interest is as follows:

Siemens Aktiengesellschaft
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Wittelsbacherplatz 2
80333 Muenchen, Germany

II. Related Appeals and Interferences

Pursuant to 37 C.F.R. §1.192(c)(2), although the real party in interest has other appeals and interferences, none of the other pending appeals and interferences is believed to directly affect or be directly affected by, or have any bearing upon the decision of the Board of Patent Appeals and Interferences in this appeal.

III. Status of Claims

Pursuant to 37 C.F.R. §1.192(c)(3), claims 1-18 are pending in this application at the filing of this Appeal Brief. Claims 1-18 stand finally rejected. Claims 1, 16, 17 and 18 are independent claims, and claims 2-15 are dependent claims.

Claims 1-17 were originally filed in the application, with claims 1-17 being amended in a preliminary amendment filed with the original application. An Office Action was issued on November 29, 2001, rejecting claims 1-17. In response thereto, claims 1, 2, 16 and 17 were further amended, and a new claim 18 added, in an Amendment filed February 28, 2002. An Office Action, citing new references, was then issued June 12, 2002, and an After Final Amendment, amending claim 18, and Supplemental Amendment, amending claims 1 and 16-18, were entered with a Request for Continued Examination on November 12, 2002. Another Amendment to claims 1 and 16-18 was filed May 5, 2003, in response to the Examiner's next issued Office Action, dated December 3, 2002. The claims have not been amended since this May 5, 2003, Amendment.

The Next Office Action was issued on July 1, 2003, and essentially set forth the now pending rejections for claims 1-18. After a series of responses were filed on September 10, 2003, January 2, 2004, and March 26, 2004, attempting to solidify the Examiner's position, an Advisory Action was issued on May 4, 2004, based on the Final Office Action, issued January 27, 2004. Another After Final response, responding to the Advisory Action, was filed June 28, 2004. With no further responses from the Examiner, and with the Examiner's position appearing to be fixed, the present Appeal was deemed necessary to rectify the differences for opinion of the patentably distinct status of the pending claims.

IV. Status of Amendments

Pursuant to 37 C.F.R. §1.192(c)(4), and as noted above, the pending claims have not been amended since the May 5, 2003, Amendment.

Pursuant to 37 C.F.R. §1.192(c)(9), a copy of the pending claims is included in their present condition in the Appendix.

V. Summary of the Invention

Pursuant to 37 C.F.R. §1.192(c)(5), embodiments of the present invention are directed toward apparatuses and methods including predicting an abnormality of a dynamic system and implementing an action based on the predicted abnormality using a "continuous information flow that describes a development of a predictability of several future system states," as recited in independent claim 1, for example. Information flow is to be understood as a development of a predictability of plural future states, as supported by the specification, the previous traversals, and the state of the art.

Embodiments of the present invention include the utilization of neural networks to determine a comparison information flow describing a comparison dynamic of a system. A test information flow, which describes a test dynamic of the system, is determined using test measured data of the system. Then, using the comparison information flow and the test information flow, an abnormality can be predicted when the comparison information flow differs significantly from the test information flow, or conversely, the non-existence of an abnormality can be established when the comparison information does not significantly differ from the test information flow. Once an abnormality has been established, a predetermined action can then be implemented.

Implementations of the present invention require the proper understanding of "information flow," as describing "a development of a predictability of plural future system states," as recited in the independent claims. Information flow should not be interpreted as plural predictions of a future state, but rather, the predictability of "plural" future system states. The specification, on page 1, also details that "[t]he information flow ... characterizes a loss of information in a dynamic system and describes decaying statistical dependencies between the entire past and a point in time that lies p steps in the future as a function of p. Among other things, the utility of such an information flow is that a dynamic behavior of a complex system can be classified, allowing a suitable parameterized model to be found that enables a modeling of data of the complex dynamic system."

Different embodiments of the present invention detail different operations that are performed when the existence of an abnormality is established, e.g., exciting the underlying system with a chaotic signal, noise, or a regular signal with an electric or magnetic field. The establishment of the abnormality may further be based on whether the test information is significantly greater or smaller than the comparison information flow.

The application further provides two examples of the present invention being implemented in the health field, e.g., preventing epilepsy seizures by the predicting of an abnormality in a person's brain and applying a signal to the brain to prevent the occurrence of the seizure. See

the present application on pages 8-11.

VI. Issues

1. Whether independent claims 1 and 16-18 are patentably distinct over Ravdin et al., U.S. Patent No. 5,862,304, in view of Smyth, U.S. Patent No. 5,465,321.

2. Whether dependent claims 2-15 are patentably distinct over the combination of Ravdin et al. and Smyth, even in view of Abrams et al., U.S. Patent No. 6,117,066.

VII. Grouping of Claims

Pursuant to 37 C.F.R. §1.192(c)(7), the claims are grouped as follows:

1. Independent claims 1 and 16, and dependent claim 2, stand and fall together;

2. Independent claim 17 stands and falls alone.

3. Independent claim 18 stands and falls alone.

4. Dependent claims 3 and 10 stand and fall together;

5. Dependent claims 4-9 and 11-15 stand and fall together.

VIII. Argument

1. Independent claims 1 and 16-18 are patentably distinct over Ravdin et al., in view of Smyth.

As an example, independent claim 18 sets forth:

"[a] method for predicting an abnormality of a dynamic system and for implementing a procedure in response to the abnormality, comprising:

training a neural network to learn the dynamics of a system;

evaluating a continuous information flow received from the system;

predicting an abnormality when the information flow differs significantly from normal state information as determined by the neural network; and

implementing a procedure, if an abnormality is predicted, to prevent or treat the abnormality,

wherein the information flow describes a development of a predictability of plural future

system states."

Thus, independent claim 18 at least details the use of a neural network to learn the dynamics of a system and comparing an evaluated continuous information flow with normal state information determined by the neural network. The remaining independent claims will be discussed more specifically below, as each independent claims includes additional limitations further defining the claimed invention.

The Examiner has argued that Ravdin et al. discloses all the claimed features of the independent claims, except for the use the claimed information flow, described as a development of a predictability of plural future system states. To disclose the claimed information flow the Examiner relies on Smyth, the disclosure of which recites a term "information flow." To justify the combination, the Examiner sets forth that it would have been obvious to modify the neural network of Ravdin et al. to use a "temporal, hierarchical pattern of information flow for the purposes of predicting future outcomes in the Ravdin et al. system in order to continuously utilize the monitored data to increase the speed and accuracy of predicted future states." The cited support in Smyth for making this modification of Ravdin et al. is set out on page 3 of the Office Action and will be addressed in more detail below.

First, it is respectfully submitted that the underlying motivation rationale the Examiner has utilized to combine the neural network of Smyth in Ravdin et al. is insufficient to support a prima facie obviousness case.

In the previous response, applicant attempted to detail the differences between Ravdin et al. and Smyth, as well as their combination not being obvious. Applicant pointed out that there would not appear to be any reason for modifying Ravdin et al. to include the neural network of Smyth, and that the modification of Ravdin et al. to include such a neural network would appear to make the invention of Ravdin et al. more complicated than anticipated by the inventors of Ravdin et al.

Specifically, in Ravdin et al., a neural network reviews variables of a patient and derives therefrom some indication as to whether that patient will have a relapse. The system in Ravdin et al. is the patient's prognostic variables, which appear to be static. Similarly, the neural network in Ravdin et al. would appear to be reviewing the static variables for a static singular answer, i.e., the neural network is interpreting data for an indication that the patient will relapse or not relapse.

Conversely, the independent claims specifically point out that the system of the presently claimed invention is a dynamic system and that the neural network must interact with that system to determine/evaluate a "comparison information flow that describes a comparison dynamic of said system," using independent claim 1 as an example.

The differences between Ravdin et al. and the presently claimed invention would appear great, at least in the field of respective neural network intended usages.

In Ravdin et al. there would not appear to be any need for a neural network that can operate with a dynamic system, or need "a temporal, hierarchical patter of information flow," relied upon by the Examiner as the reasoning for modifying Ravdin et al.

Ravdin et al. would even appear to be particularly directed toward a static system, such that there would not appear any reason to change Ravdin et al. to now have a much more complicated system and to review a dynamic information. Ravdin et al. would appear to work as intended with the static patient variables and neural network designed specifically therefore.

In response to similar previous presented remarks, in the Advisory Action issued May 4, 2004, the Examiner indicated that applicant's recently filed Request for Reconsideration was considered, but that the Examiner disagreed with applicant's argument that it would not have been obvious to modify Ravdin et al. to include the neural network of Smyth, and disagreed with the premise that Ravdin et al. is directed toward a "static" system.

In further supporting the obviousness argument, the Examiner in the Advisory Action again merely indicates that it would have been obvious to incorporate the neural network of Smyth into Ravdin et al., since the evaluation of a temporal and hierarchical pattern of information flow of the neural network of Smyth would enable Ravdin et al. to have "robust decision making, ultimately increasing the speed and accuracy with which future diseases states are predicted."

Thus, in addition to the unsupported increased speed and accuracy, the Examiner states that a benefit of the neural network of Smyth, *in the system of Smyth*, "enables robust decision making." This would appear to be a vague benefit insufficient motivation for changing the neural network of Ravdin et al. to the neural network of Smyth. If this motivation were sufficient, then it would be obvious to modify every neural network, or for every system to include the neural network of Smyth, to enable "robust decision making." However, the underlying systems must be taken into account and, it is respectfully submitted, the relied upon motivation must be somewhat directed toward Ravdin et al. or a system/operation similar to Ravdin et al.

Thus, it would appear that the proffered modified neural network of Ravdin et al. may be over complicated, since Ravdin et al. would not appear to need a neural network to "continuously [utilize] the monitored data." Further, the rejection would appear to fail to indicate how such usage would increase speed and accuracy of predicted future states, as proffered in Office Action, or indicate why the same is needed or beneficial in/to Ravdin et al.

The operation of Ravdin et al. would appear to be simple in that static information is input and a singular answer would appear to be output, i.e., Ravdin et al. would appear to be merely interpreting a static picture to determine whether that picture signifies a relapse or not. In addition, Ravdin et al. does not need to calculate the predictability of plural future system states.

Thus, it would not appear probable that one skilled in the art would have looked to the neural network of Smyth and bodily incorporated that neural network into Ravdin et al. There would not appear to be any reason for such a modification of Ravdin et al.

Further, as noted above, the underlying rationale for modifying Ravdin et al. is to enable Ravdin et al. to use "temporal, hierarchical pattern of information flow for the purpose of predicting future outcomes in the Ravdin et al. system in order to continuously utilize the monitored data to increase the speed and accuracy of predicted future states." This rationale would appear to be merely a conclusion, without underlying support. The Examiner has simply concluded that the addition of the Smyth neural network would have added these benefits to the system of Ravdin et al., and that these benefits are needed or desired in Ravdin et al.

MPEP § 2142 states that "[w]hen the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the Examiner to explain why the combination of the teachings is proper." The Examiner is required to present actual evidence and make particular findings related to the motivation to combine the teachings of the references. In re Kotzab, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); In re Dembiczak, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Broad conclusory statements regarding the teaching of multiple references, standing alone, are not "evidence." Dembiczak, 50 USPQ2d at 1617. "'The factual inquiry whether to combine the references must be thorough and searching.'" In re Lee, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002) (citing McGinley v. Franklin Sports, Inc., 60 USPQ2d 1001, 1008 (Fed. Cir. 2001)). The factual inquiry must be based on objective evidence of record, and cannot be based on subjective belief and unknown authority. Id. at 1433-34. The Examiner must explain the reasons that one of ordinary skill in the art would have been motivated to select the

references and to combine them to render the claimed invention obvious. In re Rouffet, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998).

Further, despite the Office Action's attempt to evidence the obviousness modification rationale by apparently relying on unsupported conclusory motivation, it is well settled that "the Board [and Examiner] cannot simply reach conclusions based on [their] own understanding of experience - or on [their] assessment of what would be basic knowledge or common sense. Rather the Board [and Examiner] must point to some *concrete evidence* in the record in support of these findings." In re Zurko, 258 F. 3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001). See also In re Lee, 277 F. 3d 1338, 1344-45, 61 USPQ2d 1430, 1434-35 (Fed. Cir. 2002), in which the court required evidence for the determination of unpatentability by clarifying that the principles of *"common knowledge" and "common sense"* may only be applied to the analysis of evidence, rather than be a substitute for evidence. The court has also recently expanded their reasoning on this topic in In re Thrift, 298 F. 3d 1357, 1363, 63 USPQ2d 2002, 2008 (Fed. Cir. 2002).

Thus, accordingly, a prima facie obviousness rejection requires concrete evidence of motivation in the record that would lead one skilled in the art to combine the relevant teachings.

It is respectfully submitted that regardless of the beneficial aspects of the neural network in Smyth, there is no evidence in the record that the same neural network should be incorporated into the system of Ravdin et al. Obviously, the neural network solves problems associated with the underlying system in Smyth, but that does not automatically make those solutions applicable, beneficial, or even necessary for every other system that may utilize neural networks. There must be some link between the solution in Smyth and the need/desire of the same in Ravdin et al. Conversely, the outstanding rejections are based solely on the benefits of Smyth's neural network and fails to provide any evidence, other than the Examiner's opinion, that the same should be modified into Ravdin et al.

Further, as noted above, the outstanding Office Action recites that Ravdin et al. discloses all the claimed features of the independent claims, except for "the information flow describing a development of a predictability of plural future system states."

Again, the Office Action thereafter indicated that it would have been obvious to modify Ravdin et al. to include a neural network, of Smyth, which "teaches future state prediction using evaluation of a temporal, hierarchical pattern of information flow for the purpose of predicting future outcomes," to "continuously utilize the monitored data to increase the speed and accuracy

of predicted future states."

Thus, in addition to the outstanding rejection failing to present a prima facie obviousness case, It is respectfully submitted that neither Ravdin et al. nor Smyth, alone or in combination, disclose or suggest all the claimed features, including the claimed information flow.

In particular, the Office Action references Ravdin et al., in column 9, lines 49-52, though this is unrelated to the claimed information flow. This portion of Ravdin et al. describes "learning iterations" of a neural network. This discussion is completely different from a description of a development of a predictability of plural future states, as recited in the independent claims.

Arguably, Smyth may discuss a similar problem as that solved by the present invention, with the object in both cases being to estimate or predict the present state of a dynamical system with regard to an outstanding abnormality.

However, none of the cited portions of Smyth disclose the claimed information flow. As noted above, the Office Action cited particular portions of Smyth, as support for Smyth disclosing the claimed information flow. These cited portions include: Smyth in the abstract; col. 2, lines 37-53; col 5, line 46 through col. 6, line 8; col. 6, lines 25-34; col. 8, lines 15-29; and col. 22, lines 29-37.

The term "information flow" is used in Smyth only in the abstract and in column 5, lines 40-41. In both cases the term "information flow" is only used rhetorically as a synonym for the course described in the respective previous lines. Here, in Smyth, the steps are concerning a method of estimating the present system state.

In the context of the presently claimed invention, the concept of "information flow" is used completely differently. The present application, as well as the claim limitations, clearly describe the development of a *predictability of plural future states*. The corresponding portions of the specification and portions of the sources cited in the specification have previously been discussed in detail.

In Smyth, on the other hand, the concept "information flow" is used purely rhetorically for a series of process steps. Smyth fails to disclose any definition of the concept "information flow". In particular, an exact mathematical definition discussed in the present invention is lacking.

Furthermore, it is respectfully submitted that one skilled in the art would immediately recognize that Smyth does not disclose or suggest the invention's solution set. Furthermore, this conclusion will now be made more clear, using the remaining portions of Smyth cited by the

Examiner.

The first portion of Smyth cited by the Examiner, column 2, lines 37-53, only describes generally possible uses in the field of health monitoring. The method and device, according to the presently claimed invention, are neither disclosed nor hinted at.

The second portion of Smyth cited by the Examiner, column 3, lines 30-45, describes only a general problem, well known in the art, in the determination of a state of a dynamical system.

The third portion of Smyth cited by the Examiner, column 5, line 46 to column 6, line 8, describes only a method for calculating the probability of numerous state transitions and for estimating the *present state* based on the determined probabilities. In all the methods known to one skilled in the art, only the first point in the future is considered. Nothing further could be derived Smyth.

Quite in contrast to this, the information flow of the presently claimed invention describes a predictability of numerous future system states: from the specification (page 1, lines 14-18) it follows that the "information flow" characterizes dwindling statistical dependencies between the whole past and an instant which lies p steps in the future, and is a function of p. The information flow thus considers p steps into the future.

In contrast to this, in the prior art, Smyth at best sets forth a single step in the future. Nothing other than this can be derived from Smyth.

The solution set of the presently claimed invention thus rests on a completely novel concept, namely the characterization of the data using an "information flow" which describes the development of a predictability of a series, i.e., plural, of future system states. Only by the comparison of such an "information flow" with a "comparative information flow" is an accurate prediction of the abnormality possible, as in the presently claimed invention. A corresponding advanced and efficient method and its mathematical definition are neither disclosed nor suggested by Smyth.

The fourth portion of Smyth referenced by the Examiner, column 6, lines 25-34, further describes only the general statement of the respective Smyth problem and the corresponding solution sets well known to one skilled in the art. Neither the method of the presently claimed invention nor the device, thereof, are disclosed or suggested.

The fifth portion of Smyth referenced by the Examiner, column 8, lines 15-29, provides only generally known technical means, which can come into use in the context of problem

setting. Here general means are concerned, well known to one skilled in the art. Again, the method and device of the presently claimed invention are neither disclosed nor suggested.

The sixth portion of Smyth referenced by the Examiner, column 22, lines 29-37, describes only the trivial Bayes' Rule, well known to one skilled in the art. The Bayes' Rule is not the same as the presently claimed invention.

Thus neither Ravdin et al. nor Smyth disclose at least the claimed information flow as being the development of a predictability of plural future system states.

In addition, among other features, it is noted that independent claims 1, 16 and 17 detail the requirement of determining a test information flow, and using that test information flow to determine the establishment of an abnormality being predicted.

Thus, in view of all the above, it is respectfully submitted that the outstanding rejections fail to support a prima facie obviousness case, as the underlying motivation rationale would not appear sufficient and because all the recited features are not disclosed by the relied upon references.

Therefore, it is respectfully submitted that independent claims 1 and 16-18 are patentably distinct from Ravdin et al. and Smyth, alone or in combination.

2. Dependent claims 2-15 are patentably distinct over the combination of Ravdin et al. and Smyth, even in view of Abrams et al.

It is respectfully submitted that dependent claims 2-15 are patentably distinct form Ravdin et al., Smyth, and Abrams et al., alone or in combination, at least in view of the above remarks regarding the patentably distinct status of independent claim 1.

In addition, it is noted that dependent claims 3 and 10 describe the establishment of whether an abnormality has been predicted based on whether the test information flow is significantly smaller or larger than the comparison information flow.

The Examiner would appear to infer that because Ravdin et al. was modified to include the neural network of Smyth then the combination would inherently disclose these features of claims 3 and 10. However, dependent claims 3 and 10 particularly detail a claimed relationship between the claimed test information and the claimed comparison information. There is no support in the record or in either reference that the prediction of an abnormality is established when the test information flow is significantly smaller than the comparison information flow. Similarly, there is no support in the record or in either reference that the prediction of an

abnormality is established when the test information flow is significantly greater than the comparison flow. In addition to none of the cited references disclosing this abnormality prediction establishment criteria if any of the references were to disclose one of the claimed techniques, e.g., the test information flow being greater than the comparison information flow, then that reference may not disclose the opposite technique. The Office Action would appear to have not addressed these claimed features sufficiently, if at all.

Lastly, the Office Action has relied upon Abrams et al. to disclose the features of claims 4-9 and 11-15, which include exciting/supplying the underlying system with particular signals or noise through an electric or magnetic field.

The rationale for modifying the combination of Ravdin et al. and Smyth with Abrams et al. to perform these features is "to provide means to effectively treat neurological and psychiatric disorders." However, the operation of the primary reference, Ravdin et al., would not appear related to the performance of actuated treatment based on the neural network's establishment of an abnormality prediction. The rationale for the addition of treatment features to Ravdin et al. would appear to be unsupported by the record. This addition would appear to evidence the fact that Ravdin et al. is not sufficiently related to the present invention to read on this claim language, i.e., the claimed implementing of an action. Without the disclosure of the present application, one skilled in the art would not have been motivated to change the primary focus of Ravdin et al. to now actually perform treatment operations. Rather, Ravdin et al. is primarily directed toward providing a physician an opportunity to detect problems before they are fully developed so the physician can then decide how to proceed to prevent that problem from fully developing.

In addition, the Examiner has indicated that the claimed chaotic signal, noise, and regular signals can be interpreted as being equal to varying intensities and impacts of the signal in Abrams et al. However, varying intensities and impacts of a signal are completely different from a chaotic signal, noise, and a regular signal, all of which are distinct from each other.

Thus, similar to above, it is respectfully submitted that this rejection of claims 4-9 and 11-15 fails to meet a prima facie obviousness case, at least for merely presenting a conclusory motivational statement, relying on support not in the record, and failing to support the conclusion that Abrams et al. discloses all the claimed features deficient in the combination of Ravdin et al. and Smyth.

Therefore, for at least the above, it is respectfully submitted that claims 2-15 are patentably distinct from Ravdin et al., Smyth , and Abrams et al., alone or in combination.

IX. Conclusion

In view of the law and facts stated herein, the Appellant respectfully submits that the Examiner has failed set forth a prima facie obviousness case against the pending claims.

For all the foregoing reasons, the Appellant respectfully submits that the cited prior art does not teach or suggest the presently claimed invention. The claims are patentable over the prior art of record and the Examiner's findings of unpatentability regarding claims 1-18 should be reversed and the patentability over the presently cited references be affirmed.

The Commissioner is hereby authorized to charge any additional fees required in connection with the filing of the Appeal Brief to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Dated: 7/28/04

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X. Appendix

1. (FOUR TIMES AMENDED) An arrangement for predicting an abnormality of a dynamic system and for implementing an action opposing the abnormality using a continuous information flow that describes a development of a predictability of several future system states, comprising:

a) a measured data pick-up that registers comparison measured data of said system and test measured data of said system;

b) a processor unit, having a neural network that models said system, said processor unit

(1) training said neural network using said comparison measured data;

(2) determining a comparison information flow that describes a comparison dynamic of said system using said trained neural network;

(3) determining a test information flow that describes a test dynamic of said system using said test measured data;

(4) using said comparison information flow and said test information flow, predicting said abnormality as established when said comparison information flow differs significantly from said test information flow, and predicting said abnormality as not established when said comparison information flow does not significantly differ from said test information flow;

(5) when said abnormality of the system has been predicted as established, then implementing said action; and

c) an actuator that implements said action,

wherein the information flow describes a development of a predictability of plural future system states.

2. (AS TWICE AMENDED) An arrangement according to claim 1, wherein said processor unit endlessly loops from said determining a comparison information flow to said implementing said action.

3. (AS ONCE AMENDED) Arrangement according to claim 1, wherein said abnormality is predicted as established when said test information flow is significantly smaller than said comparison information flow.

4. (AS ONCE AMENDED) An arrangement according to claim 3, wherein said action comprises exciting said system with a chaotic signal.

5. (AS ONCE AMENDED) An arrangement according to claim 4, wherein said action comprises supplying noise to said system.

6. (AS ONCE AMENDED) An arrangement according to claim 5, wherein said noise is supplied by a corresponding electrical field.

7. (AS ONCE AMENDED) An arrangement according to claim 6, wherein said electrical field is supplied by at least one electrode.

8. (AS ONCE AMENDED) An arrangement according to claim 5, wherein said noise is supplied by a corresponding magnetic field.

9. (AS ONCE AMENDED) An arrangement according to claim 8, wherein said magnetic field is supplied by at least one electrode.

10. (AS ONCE AMENDED) An arrangement according to claim 1, wherein said abnormality is predicted as established when said test information flow is significantly greater than said comparison information flow.

11. (AS ONCE AMENDED) An arrangement according to claim 10, wherein said action comprises exciting said system with a regular signal.

12. (AS ONCE AMENDED) An arrangement according to claim 11, wherein said regular signal is supplied by an electrical field.

13. (AS ONCE AMENDED) An arrangement according to claim 11, wherein said electrical field is supplied by at least one electrode.

14. (AS ONCE AMENDED) An arrangement according to claim 11, wherein said regular signal is supplied by a magnetic field.

15. (AS ONCE AMENDED) An arrangement according to claim 14, wherein said magnetic field is supplied to said system by at least one electrode.

16. (FOUR TIMES AMENDED) A method for predicting an abnormality of a dynamic system and for implementing an action opposing the abnormality using a continuous information flow that describes a development of a predictability of several future system states, comprising:

a) measuring comparison measured data of said system and test measured data of said system;

b) determining a neural network that models said system using said comparison measured data;

c) determining a comparison information flow that describes a comparison dynamic of said system using said neural network;

d) determining a test information flow that describes a test dynamic of said system using said test measured data;

e) comparing said comparison information flow to said test information flow using said comparison information flow and said test information flow;

f) determining said abnormality to be predicted as established when said comparison information flow differs significantly from said test information flow;

g) determining said abnormality to be predicted as not established when said comparison information flows does not significantly differ from said test information flow; and

h) implementing said action when said abnormality of said system has been predicted as established,

wherein the information flow describes a development of a predictability of plural future system states.

17. (FOUR TIMES AMENDED) A method for predicting an abnormality of a dynamic system using a continuous information flow that describes a development of a predictability of several future system states, comprising the steps of:

a) measuring comparison measured data of said system and test measured data of said system;

b) determining a comparison information flow that describes a comparison dynamic of said system using said comparison measured data;

c) determining a test information flow that describes a test dynamic of said system using said test measured data;

d) comparing said comparison information flow to said test information flow using

said comparison information flow and said test information flow;

e) determining said abnormality to be predicted as established when said comparison information flow differs significantly from said test information flow; and

f) determining said abnormality to be predicted as not established when said comparison information flow does not significantly differ from said test information flow,

wherein the information flow describes a development of a predictability of plural future system states.

18. (THREE TIMES AMENDED) A method for predicting an abnormality of a dynamic system and for implementing a procedure in response to the abnormality, comprising:

training a neural network to learn the dynamics of a system;

evaluating a continuous information flow received from the system;

predicting an abnormality when the information flow differs significantly from normal state information as determined by the neural network; and

implementing a procedure, if an abnormality is predicted, to prevent or treat the abnormality,

wherein the information flow describes a development of a predictability of plural future system states.